special case of the square) and with four right angles. This follows from the definitions given in the Merriam-Webster's Collegiate Dictionary, 10th Edition, Springfield, MA, 2002. Copies of the title page and the relevant pages of this reference are appended (total of 5 sheets). Thus, any planar figure that does not have four right angles is non-rectangular. Referring to Fig.2, one can see that the overall shape of the capacitor C2 is not rectangular, since the shape of the capacitor is comprised of several joined rectangles arranged so as to form the overall capacitor. The dashed lines within the boundary of the capacitor are placed so as to emphasize that the shape of the capacitor is formed from contiguous rectangular elements

The upper electrode of C2, for example, while having a border which is comprised of linear segments, does not conform to the definition of a rectangle, even though it might be decomposed graphically into a plurality of contiguous rectangular components. This is distinguished from the capacitor C6 which has two non-contiguous sections structurally, but is electrically connected in parallel. In order clarify this distinction, Applicants have amended Fig. 2 so that the multiple use of the designators C2 and C7 has been eliminated, now clearly designating those capacitors as individual circuit elements having non-rectangular perimeters, defined by contiguous rectangular elements. Claim 1 has also been amended to be consistent with this language and dependent claims 8 and 9 added to further describe the geometry and construction of the capacitor as disclosed by the Applicants.

A marked-up copy of the Fig. 2, with the changes shown in red ink is appended to this paper. The Examiner is requested to review the drawing and indicate his approval; the Applicants will prepare and submit a revised formal drawing as part of the formalities after a Notice of Allowance is received.

With respect to the rejection of Claims 1-4 under 35 U.S.C. §112, second paragraph, the concept of a non-rectangular capacitor perimeter which is formed by appending various rectangular shapes to a first rectangular shape, or to rectangular shapes appended thereto in forming the overall area of a plate of the capacitor, can be

easily understood from Applicants' disclosure, in the context of the definition of a rectangle. As such, Applicants submit that the rejection of Claims 1-4 under 35 U.S.C. §112 is overcome.

Claims 3 and 4 were rejected under 35 U.S.C. §112, second paragraph for the use of the term "earth capacitor", which the Examiner contends is not otherwise found in the disclosure. Applicants point out that the term "earth capacitor" is found on page 4 in the paragraph commencing on line 12. While "earth" is a synonym for "ground" in electronics usage, in order to avoid the suggestion that there is a lack of unity of meaning between the two words, the Applicants have amended the specification and Claims 3 and 4 to substitute "ground" for "earth" wherever it appears so that the wording is consistent throughout.

Now, turning to the rejection of Claims 1 and 2 under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Haq (US 6,146, 743) and Arai (US 6,410,960) or, in the alternative the combination of Haq (US 6,146,743), Arai (6,410,960) and Shahani (6,028,990), Applicants respectfully request reconsideration.

The Examiner cites Haq as teaching the use of capacitors in electronic circuits, where the capacitors are formed by either thick film or thin film techniques at column 9, lines 45-51, but states that Haq does not explicitly teach the capacitor shape claimed by Applicants. However, the claimed capacitor shape is relevant to Applicants' invention. Even combining the teachings of Haq and Arai, there is nothing to suggest the use of the non-rectangular capacitor shape to achieve an object of the Applicants' invention, which is to dispose the capacitive element in contiguous areas of the circuit physical layout which are not needed for other components. This would not have been obvious to one skilled in the art, where it is usual to design with circuit components of simple shape.

The choice of a non-rectangular capacitor shape which can be geometrically decomposed into an assemblage of rectangular elements as described by the

Applicants increases both the capacitance, which is useful in many circuit applications, particularly for ground capacitors. The invention provides the person performing the circuit layout with substantially increased flexibility in achieving an optimum value for the capacitor within space constraints

The Examiner suggests that it would be typical to achieve the non-rectangular capacitor by "routine experimentation and optimization" but provides no basis for the contention. Applicants submit that it is not design practice to do so, as construction of multiple prototypes by thin film techniques would be required at significant expense. Rather, using Applicants' invention, the designer can accurately predict the capacitance value expected by computing the capacitor surface area, combined with knowledge of the separation of the capacitor plates and the dielectric constant of the material between the plates.

Since neither Haq or Arai teach the non-rectangular shape of the capacitor, and nothing in either of the references suggests such a teaching, the combination of references does not constitute a valid basis for a 35 U.S.C. § 103(a) rejection.

In the alternative, the Examiner also relies upon cited Shahani at column 7, lines 23-32 in combination with Haq and Arai, under 35 U.S.C §103 (a). Applicants submit that this combination fails also.

Shahani, teaches a method of achieving higher capacitance by increasing the capacitance per unit surface area of the capacitor. The capacitor structure disclosed by Shahani however, is very different than Applicants' claimed structure. The capacitor taught by Shahani may be analyzed as two coupled capacitors connected in parallel; in effect a total of four capacitor plates when the two coplanar fringing gap capacitors are explicitly recognized. The polarity of the adjacent plates on each surface must be opposed to each other and the two parallel plate capacitors cross-connected in parallel. In the Shahani structure, removing one of the parallel plate capacitors, so as to create a single parallel-plate capacitor as claimed by the Applicants, would create a capacitor

with one edge of the upper and lower plates comprised of a fractal boundary having no useful function. This structure of Shanahi is quite different than Applicant's claimed structure which recites a capacitor comprised of two parallel plates. The structure in Shahani would have undesirable properties, such as the increased parasitic resistance, without any increase in capacitance per unit area, and with increased parasitic inductance due to the large scale interdigitations of the coplanar elements. This is best seen by eliminating one of the two coplanar elements, for example from Fig 8B in Shahani.

In Shahani, within the area intended for the capacitor, each of the upper and lower capacitive plates is divided in two, such that a shape of the upper plate and a corresponding identical shape in the lower plate are opposed to each other with an intervening dielectric. This introduces what might be considered in other circumstances as a stray capacitance between the coplanar capacitor plates. By cross-connecting the plates, as taught by Shahani, a single capacitor is formed and the stray capacitance is employed to increase the overall capacitance. The gap between the separate plates on each surface is suggested to be a maximum of 1μm (page 9, lines 29 t0 34), and much smaller separations are said to be desirable in order to achieve the object of Shahani. A graph of this property is given in the technical paper cited in the accompanying supplemental Information Disclosure Statement. Shahani uses fractal mathematical techniques to maximize the length of the interior boundary between the co-planar capacitive elements in each of the planes, subject to constraints of increasing parasitic resistance. However, parasitic effects are to be avoided in ground capacitor applications as those of the claims of this application, since such a use requires selection of a capacitor design that minimizes the equivalent series resistance and inductance. To achieve a high capacitance using the technique taught by Shahani, the complexity of the fractal boundary between the coplanar plates is employed to achieve the greatest practical length. In doing so, each of the plates itself becomes convoluted in shape and this, as well as the connection needed to cross-couple the two capacitors, increases the stray inductance causing undesired resonances. This mitigates against the selection of such a capacitor design approach for ground capacitor applications.

There is therefore no motivation for one skilled in the art to combine the teachings of Shahni with those of Haq and Arai. As such, Applicants respectfully submit that this rejection should be withdrawn

An Information Disclosure Statement was submitted accompanying the filing of the application; however the first Office action did not include an initialed copy of Form 1449. The Information Disclosure Statement was marked with the Express Mail receipt number, mentioned in the transmittal letter and on the acknowledgement postal card, copies of which are attached hereto. A duplicate copy of the Information Disclosure Statement and the referenced documents is also attached. A supplemental Information Disclosure Statement is also submitted. The Examiner is requested to make them a matter of record.

The Applicants respectfully submit that as a result of the clarification to the claims and the arguments presented, the application should now be in a condition for allowance.

Attached hereto is a marked-up version of the changes made to the specification, drawings and claims by the current amendment. The attached page is captioned **"VERSION WITH MARKINGS TO SHOW CHANGES MADE."**

Respectfully submitted,

Gustavo Siller, Jr.
Registration No. 32,305
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph on page 4, commencing at line 12.

Furthermore, in the above-mentioned structure, the non-rectangular capacitor is desirably a ~~n~~ ground ~~earth~~ capacitor, and a ~~n~~ ground ~~earth~~ capacitor having a relatively large capacitance can be mounted within a space on the alumina substrate in high density by using the non-rectangular capacitor as the ground ~~earth~~ capacitor.

Add a paragraph on page 14 following line 9.

The non-rectangular shapes are comprised of a first rectangular shape to which a second rectangular shape is contiguously located to form a non-rectangular shape and which may be further extended by contiguously locating additional rectangular shapes thereto. Ground capacitors C2 and C7 are examples of this structure. The resultant non-rectangular shape is continuous, and the upper and lower capacitor plates thus formed are each continuously conductive.

In the Claims:

1 (Amended). An electronic circuit unit comprising:

an alumina substrate;

thin film circuit elements including capacitors, resistors, and inductance elements formed on the alumina substrate;

thin film conducting patterns connected to the circuit elements formed on the alumina substrate; and

a semiconductor bare chip mounted on the alumina substrate and wire bonded to the conducting pattern,

wherein at least one of the capacitors is comprised of two parallel plates disposed on either side of a dielectric material and whose perimeter has a non-rectangular shape.

3.(Amended) The electronic circuit unit according to claim 1, wherein the non-rectangular capacitor is a~~n earth~~ ground capacitor.

4. (Amended) The electronic circuit unit according to claim 2, 10, or 11-, wherein the non-rectangular capacitor is a~~n earth~~ ground capacitor.